self at home. He repudiates Altmann's claims to priority with regard to the importance of cell granules. The description of the different types of leucocytosis and leucocythæmia is exceedingly good, and perhaps constitutes the most valuable section of the work. It is unfortunate that the translator has not seized the opportunity, as he has done in the case of Kanthack and Hardy's investigations, of referring to the very important work done by Muir on experimental leucocytoses and leucocythæmia. It is to him that we are indebted in the first place for the recognition of the "leucoblastic" type of marrow in experimental leucocytosis.

Ehrlich's chemiotactic theories with regard to the emigration of different cells from their seat of formation, the marrow, into the blood, and from the blood into the tissues, &c., are presented in a most interesting fashion, although, unfortunately, it is still impossible to speak about the etiology of medullary leucocythæmia in anything but the most indefinite way. To Dr. Myers' translation one can only refer in terms of praise. Perhaps it errs at places by being rather too literal. References to Jenner's eosin-methylene blue mixture, and to Kanthack and Hardy's work, are welcome additions made by the translator and editor. Confirmation and amplification of the very important investigations of Kanthack and Hardy, and Hardy alone, on the solution of oxyphil granules when cells containing the latter come in contact with chains of *B. anthracis*, &c., would be heartily welcomed by all who are interested in the subject of leucocyte secretions. T. H. MILROY.

BIOLOGY AT WOODS' HOLL, U.S.A.

Biological Lectures from the Marine Laboratory at Woods' Holl, U.S.A., for 1899. Pp. 282. (Boston: Ginn and Co., 1900.)

THE present volume, like all its predecessors, is replete with interest and full of testimony to the activity and good work of the Whitman School. It contains the reports of sixteen lectures, of which as many as four are for the first time botanical; and although among the zoological writers we miss the names of Whitman and one or two of the most tried among his earlier collaborateurs, the effects of their teaching and example are all evident. More especially is this the case with the lectures by C. M. Child on "The Significance of the Spiral Type of Cleavage," and by E. Thorndike on "Instinct," in which certain of Whitman's most famous conclusions receive support.

Conspicuous lectures are those by C. B. Davenport on "The Aims of the Quantitative Study of Variation," and by Jacques Loeb on "The Nature of the Process of Fertilisation," each in extension of work for which these investigators are now well known. The latter writer, dealing with facts which show that the process of fertilisation and development may be produced in the egg cell by the action of certain salts, to an advanced stage, would have us believe he has transferred the problem of fertilisation from the realm of morphology into the realm of physical chemistry. There is an important address by Alphæus Hyatt on "Some Governing Factors usually neglected in Biological Investigations," in which the uniformitarian hypothesis receives a check and a defence is set up of a law of "Tachygenesis" or "abbreviated development"; and there is incorporated in it a discussion on heredity, in its bearings on Ribot's argument that it is a "specific memory," and that a form of automatism is the link between memory and habit.

T. H. Morgan continues to write on "Regeneration," and among the lectures there are two which are noteworthy as embodying full bibliographies, of service for reference—viz. those by A. G. Mayer on "The Development of Colour in Moths and Butterflies," and by G. N. Calkins on "Nuclear Division in Protozoa." Interest amounting to novelty is greatest as concerns the work of C. H. Eigenmann on the breeding habits of the blind-fishes, the Amblyopsidæ, of the Mississippi Valley, in which the discovery that the bleached condition is assumed by the young even when reared in the light, is brought forward as evidence of hereditary establishment of an effect of the environment; and as concerning a lecture by H. S. Jennings on "The Behaviour of Unicellular Organisms," in which, from the fact that a multiplicity of causes may bring about similar reactions, it is argued that organisation and not the nature of the stimulus determines the result of experiment. Of the botanical lectures, that by D. H. Campbell on "The Evolution of the Sporophyte" furnishes an argument in favour of the abandonment of aquatic life having had a potent influence in its higher development, while another by D. P. Penhallow will be useful, as giving a succinct account of the alteration and carbonisation processes undergone by vegetable organisms during fossilisation. The remaining lectures are upon the effects of temperature and currents of air upon distribution, the significance of mycorrhizas, the associative processes in animals, and the "Physiology of Secretion"; and the *tout ensemble* gives promise of increased attention in the future to questions of cytology, in both their experimental and physiological aspects, with a leaning to those which involve philosophic principles and abstract ideas. No doubt much of the biological work of the next generation will be of this type, but in view of the probability that that may stand in danger of being overdone, and of the idea that nothing remains possible on the old lines, it may be said that in the very book under review there is reached the conclusion that "it is the individual which is the unit and not the cell." In the future, when everything will need to be gone over again under an advance in methods and a better understanding, the facts of mere anatomy—the value of which there is a growing tendency to depreciate—will assuredly prove as important and instructive as in the past. Our American brethren may do well to bear this in mind.

OUR BOOK SHELF.

Brief Guide to the Commoner Butterflies of the Northern United States and Canada. Being an Introduction to a Knowledge of their Life-histories. With Illustrations of all the Species. By Samuel Hubbard Scudder. Pp. xi + 210; 22 plates. (New York: Henry Holt and Co., 1899.)

OUR notice of the first edition of this work appeared in NATURE for August 10, 1893. This is not before us while writing; but as far as we can tell without actual comparison, the present edition, as regards the letter-

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press, is little more than a reprint of the first. But the plates are a welcome addition. They represent seventy-three species, without colour, carefully drawn and easily recognisable, though sometimes badly printed. The small size of the book renders it very convenient for handy reference. A European entomologist will recognise one or two old friends, such as the Camberwell Beauty, the Painted Lady, Red Admiral, and a Small Copper, hardly distinguishable from our own; but the proportions of the various families and genera are very different from what obtains in Europe. A single plate, representing five species, and another representing only six species, are enough to illustrate the Satyridæ, and the Blues and Coppers together; while a much more crowded plate is required for the Hair-Streaks, and two for the Skippers. There are also several very large and conspicuous species, including six large Swallow-Tails, and the northern representatives of several tropical genera. But although the average size of the North American butterflies is much larger than ours, and much of the settled part of the country lies much further south, the number of species in the Northern States is much smaller than in Europe, owing to the comparative absence of Satyridæ and Lycænidæ; and it is not till we reach the frontiers of Mexico that the vast wealth of the tropical American butterfly fauna (almost equalling that of all the other continents put together) begins to dawn upon us.

W. F. K.

Elements of Qualitative Analysis. By G. H. Bailey, D.Sc., Ph.D., and G. J. Fowler, M.Sc. Pp. 115. (Manchester: J. E. Cornish, 1900.)

AMONG the distinctive characteristics of this addition to the already numerous volumes on practical chemistry are: the prominence given to the recognition of common elementary substances by an examination of their simple physical and chemical properties, the attention given to dry methods of analysis, and the series of flame-reactions. These sections provide students of practical chemistry with excellent exercises in manipulation, and will counteract the belief that the best way to analyse a substance is always to dissolve it and go through the usual routine treatment of solutions and precipitates. There is little sympathy with ordinary qualitative analysis at the present time, but where the subject is taught it should be taught intelligently; and as this little book provides a reasonable course of laboratory work, it merits a trial.

LETTERS TO THE EDITOR.

[*The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts intended for this or any other part of* NATURE. *No notice is taken of anonymous communications.*]

Railways and Moving Platforms.

ABOUT twenty years ago I was in the habit of speaking with Prof. Ayrton and other friends about a scheme which might increase ten-fold the carrying capacity of the Underground Railway. I prepared a letter for the *Times* newspaper about two years ago, but at the earnest entreaty of a friend I applied for patent protection for the scheme, and did not publish the letter. I have not proceeded with the patent, and wish now that I had published the letter. Indeed, I wish that, instead of merely talking the matter over with friends twenty years ago, I had published what I had to say.

Travelling now on the new Central London Railway, one feels that there is enormous waste of energy and of time in starting and stopping the trains. Again, a train must not be longer than the platform. On my scheme the train does not stop, and the longer it is the better. Indeed, I can imagine an endless train keeping a perfectly constant speed all the time.

My scheme is easy enough to understand now that moving platforms are common. After passengers enter a station I get them gradually into a state of motion, so that moving alongside the train and at the same speed, they may enter and other passengers may leave. There are many ways in which the scheme may be carried out. From a wayside station passengers may enter an express train which does not stop, in the following way. They enter a small train at the station; this train gradually gets up a speed equal to that of the express; it runs alongside the express at a particularly well-laid part of the line; there is an exchange of passengers, and the local train gradually comes to rest again at the station.

For the Underground Railway, the method which most commended itself to Prof. Ayrton and me long ago was this. At a station, say St. James's Park, the platform was a carefully constructed turntable, 500 feet in diameter, the rim of which travelled at 8 miles per hour. The whole area was not really a floor; it was only a skeleton of a turntable, being an outer rim 8 feet broad and many radial passages. The very long train to Mansion House, travelling at 8 miles per hour, was close to the rim of the turntable; indeed geared with it in a rough, simple manner for less than half its circumference; the train from Mansion House did the same on the other side. I need not speak of the automatic opening and closing of the doors of the train.

A passenger, let us say second class for Mansion House, takes his ticket and descends a spiral staircase, which revolves so slowly that even the frailest and most timid of old ladies is not frightened; in fact, it revolves on its own axis once in 134 seconds. At the bottom the passenger sees a few notices; one of them saying second class, Mansion House, has a hand pointing along a radial passage, and this is followed. As the passenger moves radially, he does not notice that he is gradually getting up speed circumferentially. He does not notice that the floor gets slightly inclined as he moves out, to counteract the small effect of centrifugal force. When he reaches the outside of the platform he probably finds a train there, seemingly at rest, with the doors open, and he enters it, moving perhaps along the platform, choosing one compartment rather than another. If he is lucky he has about one minute in which to make his choice. But he will notice near him on the platform an altering time signal which tells him how much more time he has to waste: 50 seconds, 40, or 30, or 20, or 10; if he delays after the signal says 0, an iron railing will come between him and the train; he will see the train moving laterally away from the platform, and he must wait seventy-four seconds before he sees a train coming laterally towards him; the railing goes away, and he has again sixty seconds in which to enter.

If he had a third class ticket to South Kensington, he would have proceeded in exactly the same way. Also every passenger wanting to leave the train at St. James's Park had sixty seconds in which to do it. Trains at 16 miles an hour give only half these times. A platform of only 250 feet diameter would give only half the time if the train speed was 8 miles an hour. I need not dwell upon the details of this and other methods which suggest themselves. It may be soon or syne, but I feel sure—I have felt sure for many years—that my method will have to be adopted.

JOHN PERRY.

August 11.

Snow-drifts on Ingleborough.

IN his interesting letter on "Snow-drifts on Ingleborough in July," Prof. Hughes describes what may be called the first stage in the formation of a glacière. These ice-caves, not very rare in parts of the Alps and Jura, were made by the present Bishop of Bristol the subject of an attractive book (published thirty-five years ago), and have been occasionally noticed in the earlier volumes of NATURE and elsewhere. I have always believed that snow, drifted into caves during the winter, was the initial cause of these natural ice-houses (about half a dozen of which I have visited), and can quote a case from the Alps which is a slight variation of that described by Prof. Hughes. On July 24, 1873, I went up the Pic d'Arzinol (9845 feet) from Evolena in the Val d'Hérens, and on the way down—so far as I remember between five and six thousand feet above sea-level—my guide diverged from the track to show me what he called the Pertuis Freiss. These were two fissures, apparently joints, opened by a slight subsidence. A description of one will serve for both, except that there was hardly any descent to its floor. The fissure extended some four yards into the hill, and was at widest about as many feet. Ice was patched about the floor, and in places

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